

MICHAEL K. ANDERSON, QEP

EDUCATION

B.S., Meteorology, Belknap College, 1970

B.A., Chemistry, University of Connecticut, 1969

PROFESSIONAL REGISTRATION/CERTIFICATIONS

Qualified Environmental Professional, 1997

AREAS OF EXPERTISE

Mr. Michael K. Anderson, QEP, has 34 years of experience encompassing:

- Power Generation Air Permitting
- Multi-Media Permitting
- Air Permitting
- Dispersion Modeling
- SIP Development
- Receptor Modeling
- Ambient Monitoring

REPRESENTATIVE EXPERIENCE

Mr. Anderson is a Senior Principal Scientist and Project Manager in TRC's Air Division. His responsibilities include performing technical analyses and managing projects involving a broad range of environmental disciplines.

Mr. Anderson has 34 years of experience managing the preparation of multi-media permit applications for power generation, cogeneration, resource recovery facilities and the combustion of hazardous waste under the boiler and industrial furnace (BIF) regulations. He has also managed and performed scores of Prevention of Significant Deterioration (PSD), Non-attainment New Source Review (NNSR), and other air permitting and compliance engineering projects for new and modified sources subject to federal and state regulations. He has managed and performed dispersion modeling and air quality data analyses pertaining to air permitting, the development of State Implementation Plans (SIPs), air toxics, risk assessments and other issues. Mr. Anderson has also provided technical expertise in the design of special monitoring programs, evaluation of model performance, impact assessments of fugitive emissions, receptor modeling analyses, and other studies involving meteorological and air quality considerations.

Power Generation Air Permitting

Mr. Anderson manages and conducts air permitting projects for new and modified power generation sources that are subject to PSD, NNSR, and other air permitting requirements. He has developed emission estimates, identified strategies to eliminate PSD, NNSR and other permitting requirements, assessed

the applicability of New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAPS), determined Lowest Achievable Emission Rate (LAER) and Best Available Control Technology (BACT) emission limits, negotiated permit conditions, and testified at public hearings and meetings.

Astoria Energy, LLC, PSD Permit Application, 1000 MW Power Plant – Queens, NY (Air Permitting Manager: 1999 – Present)

Mr. Anderson managed the preparation of the Prevention of Significant Deterioration (PSD), Non-attainment New Source Review (NNSR) and Title V Air Permit Application and corresponding sections of the Article X Application to the Board of Electric Generation Siting and the Environment at the New York State Department of Public Service (NYS DPS) for a 1000 MW combined-cycle dual fuel-fired power plant in Astoria, Queens, New York. He determined the stack height needed to meet the requirements of both the New York State Department of Environmental Conservation (NYS DEC) and the Federal Aviation Administration (FAA) for LaGuardia Airport. He prepared reports on environmental justice, air quality impacts modeling based on the future economic dispatch of power in the region, and multi-source modeling to satisfy City of New York requirements. Mr. Anderson also provided testimony at public hearings concerning air quality and visible plumes of condensed water vapor. He obtained full approval of the proposed emission control technologies and dispersion modeling analyses from the NYS DEC and NYS DPS. Since construction of the first 500 MW portion of the plant, Mr. Anderson has managed the preparation of various applications to modify the construction and operating (Title V) permits.

Kleen Energy Systems, PSD Air Permit Application, 600 MW Power Plant – Middletown, CT (Air Permitting Manager: 2000 – Present)

Mr. Anderson managed the preparation of the Prevention of Significant Deterioration (PSD) air permit application and corresponding sections of the Connecticut Siting Council application for a 600 MW combined-cycle dual fuel-fired power plant in Middletown, Connecticut. He provided testimony at public hearings concerning air quality and the potential for visible plumes of condensed water vapor. Mr. Anderson managed the preparation of multi-source dispersion modeling analyses to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS) and PSD increments. Draft air permits have been issued and final approval is expected following regulatory agency review of an air permit application supplement that updates the proposed emission rates and the emission control technology and multi-source dispersion modeling analyses, and upon completion of an agreement for obtaining the necessary nitrogen oxides (NO_x) offsets.

Lawrence Energy Center LLC, PSD Air Permit Application, 810-1100 MW Power Plant – Lawrence County, OH (Air Permitting Manager: 2001 – 2005)

Mr. Anderson managed the preparation of the Permit to Install/Prevention of Significant Deterioration (PTI/PSD) air permit application and corresponding

sections of the Ohio Power Siting Board application for a 810 MW (1100 MW with duct firing) combined-cycle natural gas-fired power plant in Lawrence County, Ohio. Full approval of the proposed emission control technologies and dispersion modeling analyses was obtained from the Ohio Environmental Protection Agency (EPA), and permits to construct the project were issued.

Fremont Energy Center LLC, PSD Air Permit Application, 540-770 MW Power Plant – Fremont, OH (Air Permitting Manager: 2000 – 2004)

Mr. Anderson managed the preparation of the Permit to Install/Prevention of Significant Deterioration (PTI/PSD) air permit application and corresponding sections of the Ohio Power Siting Board application for a 540 MW (770 MW with duct firing) combined-cycle natural gas-fired power plant in Fremont, Ohio. He obtained full approval of the proposed emission control technologies and dispersion modeling analyses from the Ohio Environmental Protection Agency (EPA). The Project is under construction.

Calpine Stony Brook, PSD Air Permit Application, 79.9 MW Power Plant Modification – Stony Brook, NY (Air Permitting Manager: 2001 – 2004)

Mr. Anderson managed the preparation of the pre-construction air permit application and information needed for corresponding sections of the State Environmental Quality Review (SEQR) Environmental Assessment for Calpine's proposed 79.9 MW second unit, to be co-located with the Nissequoge Cogen Partners facility on the State University of New York (SUNY) campus in Stony Brook, New York. Since the proposed project constituted a major modification to an existing major source, it was subject to both Prevention of Significant Deterioration (PSD) and Non-attainment New Source Review (NNSR) regulations. Mr. Anderson worked with client to develop iterative review and refinement of emissions profile. He determined the stack height needed to minimize visual impacts and meet the requirements of the NYS DEC. He managed the comprehensive dispersion modeling and environmental justice analyses needed to demonstrate compliance with the applicable standards and criteria. All pre-construction environmental permits and approvals were obtained in a six-month timeframe, but the project was not constructed because the developer and landowner were unable to reach contract agreement.

Kings Park Energy, LLC, Pre-Construction Air Permit Application, 300 MW Power Plant – Kings Park, NY (Air Permitting Manager: 2000 – 2003)

Mr. Anderson managed the preparation of the pre-construction air permit application and corresponding sections of the Article X Application to the Board of Electric Generation Siting and the Environment at the NYS DPS for a 300 MW simple-cycle dual fuel-fired power plant in Kings Park, New York. He assisted in the development of the project design to ensure that it would not be subject to Prevention of Significant Deterioration (PSD) requirements. He determined the stack height needed to minimize visual impacts and meet the requirements of the NYS DEC. He prepared reports on air quality impacts modeling based on the future economic dispatch of power in the region and to address the recently

adopted National Ambient Air Quality Standards (NAAQS) for particulate matter with a nominal aerodynamic diameter of less than or equal to 2.5 micrometers (PM_{2.5}). Mr. Anderson provided testimony at public hearings concerning air quality and the potential for visible plumes of condensed water vapor. He obtained full approval of the proposed emission control technologies and dispersion modeling analyses from NYS DEC (issuance of draft air permits). The Project development rights were sold to another firm that subsequently withdrew the permit applications.

CPV Cana, PSD Air Permit Application, 245 MW Power Plant – St. Lucie County, FL (Project Manager: 2001 – 2003)

Mr. Anderson was the Project Manager for the preparation of the Prevention of Significant Deterioration (PSD) air permit application and corresponding documents subject to review by the St. Lucie County Board of County Commissioners for a 245 MW combined-cycle dual fuel-fired power plant in St. Lucie County, Florida. He directed the completion of multi-source dispersion modeling analyses to determine the cumulative impacts of all recently proposed nearby power plants. He provided testimony regarding air quality at public hearings. Full approval of the proposed emission control technologies and dispersion modeling analyses was obtained from the Florida Department of Environmental Protection (DEP), and the air permits were issued.

CPV Warren, PSD Air Permit Application, 580 MW Power Plant – Front Royal, VA (Air Permitting Oversight and Support: 2001 – 2003)

Mr. Anderson provided oversight review of the preparation of the Prevention of Significant Deterioration (PSD) air permit application and corresponding documents subject to review by the State Corporation Commission (SCC) for a 580 MW combined-cycle power plant in Front Royal, Virginia. He also provided testimony regarding the Project's proposed emission controls, emission rates, and air quality impacts, as well as the air quality benefits expected when operation of CPV Warren displaces that of less efficient power plants whose emissions per MW of power produced are much greater. Important issues were the potential air quality and visibility impairment impacts at the nearby (7 km) Shenandoah National Park (a PSD Class I area), and the cumulative impacts of all the recently proposed power plants in Virginia. The analyses to address these issues were approved by the National Park Service (NPS) and the Virginia Department of Environmental Quality (DEQ), and the air permits were issued.

Yale University, Air Permit Applications, 18 MW Cogeneration Plant – New Haven, CT (Project Manager: 1994 – 1998)

Mr. Anderson prepared air permit applications for an 18 MW cogeneration plant which included three 6 MW gas turbines with power augmentation and duct firing and three 1.5 MW peaking diesel engines fueled with natural gas and distillate oil plus one 100,000 pounds per hour steam boiler fueled with natural gas and residual oil. He assisted in the development of the project design to ensure that the proposed modifications at the existing boiler plant would not be subject to

Prevention of Significant Deterioration (PSD) and Non-attainment New Source Review (NNSR) requirements. He demonstrated compliance with all regulatory requirements and also retained the economically beneficial approval to continue to use residual oil.

IEC Energy Systems, Plymouth State College, Air Permit Application, Cogeneration Facility Permitting – Plymouth, NH (Project Manager: 1994 – 1995)

Under contract to IEC Energy Systems, Mr. Anderson prepared a complete air permit application package for the construction of a 2.5 MW cogeneration facility that includes two diesel generators and three auxiliary boilers. He resolved critical issues such as stack height, model predicted violations of ambient standards caused by existing sources, and the required emission controls for nitrogen oxide (NO_x) emissions.

IEC Energy Systems, State Correctional Facility, Air Permit Application, Cogeneration Facility Permitting – Clinton, NJ (Project Manager: 1992)

For IEC Energy Systems, Mr. Anderson prepared a complete air permit application package for the construction of a 3.5 MW cogeneration facility at the Edna Mahan Correctional Facility/Hunterdon Development Center in Clinton, New Jersey. The project involved a gas turbine and duct burner system with two auxiliary boilers. He resolved critical issues such as acceptable heights and locations for the facility stacks.

Multimedia Permitting

Mr. Anderson directs the preparation of permit applications pertaining to environmental siting approval, the construction and operation of air pollutant emission sources, water use diversions, water quality certification, wastewater discharges, inland wetlands, stormwater discharges, cultural and historical resources, and threatened and endangered species. He also manages the dispersion and deposition modeling, human health risk assessments, noise modeling, visual impact studies, plume visibility analyses, cooling tower impact analyses, traffic studies, Phase I site assessments, emission test trial burns and other analyses required for such projects.

O&G/SNEW/CMEEC, Environmental Permit Applications, 50 MW Reciprocating Engine Repowering Project – Norwalk, CT (Technical Director: 2003 – 2005)

As Technical Director, and working on behalf of O&G Industries, South Norwalk Electric and Water (SNEW), and the Connecticut Municipal Electrical Energy Cooperative (CMEEC), Mr. Anderson addressed and oversaw issues related to land use, zoning, consistency with local plans and policies, visual resources, air quality, noise and traffic at SNEW's existing electrical generating facility in Norwalk, Connecticut. He provided oversight during noise modeling and attenuation, which was required due to the proximity to residential areas. He

also managed the preparation of air permits and provided expert testimony to the Planning and Zoning Commission and the Connecticut Siting Council. Mr. Anderson assisted in the development of the project design to ensure that it would meet Non-attainment New Source Review (NNSR) and Lowest Achievable Emission Rate (LAER) requirements, and not be subject to Prevention of Significant Deterioration (PSD) requirements. Draft air permits have been issued and final approval is expected upon completion of an agreement for obtaining necessary nitrogen oxides (NO_x) offsets.

Hawkeye/NGS/SESI, Environmental Permit Applications, 79.9 MW Power Plant – Medford, NY (Project Manager: 2003 – 2004)

Mr. Anderson managed the preparation of permit applications necessary to obtain the required environmental permits for a proposed 79.9 MW facility. Medford Energy, a partnership of Hawkeye Construction, Northeast Generation Services (NGS) and Select Energy Systems Inc. (SESI) proposed to develop the project in two contiguous phases with Phase I leading to simple-cycle operation by the summer of 2004 and Phase II leading to combined-cycle operation by February 2005. Mr. Anderson assisted in the development of the project design to ensure that it would not be subject to the Prevention of Significant Deterioration (PSD), Non-attainment New Source Review (NNSR) and Article X regulations, and so that the Long Island Power Authority (LIPA) would act as the State Environmental Quality Review (SEQR) Lead Agency and issue a Negative Declaration for the entire project. Mr. Anderson obtained full approval of the proposed emission control technologies and dispersion modeling analyses from NYS DEC (issuance of draft air permits). Project development ended in the absence of an acceptable power sales agreement.

U.S. Generating Company/PG&E/Lake Road Generating, Environmental Permit Applications, 792 MW Power Plant Permitting – Killingly, CT (Project Manager: 1997 – 2004)

Mr. Anderson directed the preparation of the comprehensive environmental impact studies and permit applications needed for a proposed 792 MW combined-cycle gas turbine power plant on a greenfield site in Killingly, Connecticut. Major permit approvals were obtained from the Connecticut Siting Council, the Town Inland Wetlands and P&Z Commissions and the Connecticut Department of Environmental Protection (CT DEP) for air and wastewater discharge permits. The plant is in full operation, and compliance testing and additional air permitting has been performed by TRC.

Pennsylvania Power & Light Global, Environmental Permit Applications, 250 MW Peaking Power Plant Permitting – Wallingford, CT (Project Manager: 1998 – 2004)

Mr. Anderson managed the preparation of the comprehensive environmental impact studies and permit applications for a nominal 250 MW simple-cycle gas turbine power plant at the existing Alfred L. Pierce generating station in Wallingford, Connecticut. Major permit applications were developed for the

Connecticut Siting Council, air emissions, and wastewater discharge. Mr. Anderson subsequently managed the completion of environmental reports and studies during the construction phase of the project, and a Title V permit application after the plant became fully operational (and compliance testing had been performed by TRC).

Town of New Milford, Environmental Oversight for a 520 MW Power Plant – New Milford, CT (Project Manager: 1998 – 1999)

Mr. Anderson managed the third party review of the environmental permit applications and impact studies prepared for a proposed 520 MW power plant in New Milford, Connecticut. He performed dispersion modeling analyses to evaluate the site selection and verify compliance with ambient air quality standards. He presented testimony to the Town Council and Inland Wetlands Commission on the full range of environmental issues involved.

Lehigh Portland Cement Company, Hazardous Waste Combustion Permitting – Cementon, NY (Project Manager: 1992 – 1993)

Mr. Anderson managed the preparation of a comprehensive package of information in support of the combustion of hazardous waste in a cement kiln. He managed the development of emission estimates, a trial burn plan, protocols for dispersion modeling, human health and ecological risk assessments and a Draft Environmental Impact Statement (DEIS) pursuant to state regulations and compliance with the federal Boiler and Industrial Furnace (BIF) regulations.

Norlite Corporation, Lightweight Aggregate Kiln, Hazardous Waste Combustion Permitting – NY (Project Manager: 1988 – 1991)

Mr. Anderson managed the development of a comprehensive set of analyses in support of the combustion of hazardous waste in a lightweight aggregate kiln. He developed emission estimates and performed dispersion modeling and risk assessments and demonstrated compliance with applicable state regulations and the federal BIF regulations.

Ogden Martin Systems, Resource Recovery Facility, Environmental Permitting – Johnston, RI (Project Manager: Prior to 1988 – 1991)

Mr. Anderson managed the preparation of air, water and solid waste permit applications for a proposed resource recovery facility. He investigated critical issues such as state air toxics standards, a human health risk assessment and the determination of BACT emission limits.

Air Permitting

Yale University, Sterling Power Plant, New Boiler Plant Permitting – New Haven, CT (Project Manager: 1998 – 2004)

Mr. Anderson managed a series of air permitting feasibility studies, comprehensive dispersion modeling analyses and air permit applications for the planned installation of several boilers and fuel firing scenarios (residual oil,

distillate oil and natural gas) at Yale university's Sterling power plant in New Haven, Connecticut. To demonstrate compliance during all pre- and post-construction operating scenarios, the modeling analyses were based on the use of direction-specific building dimensions and operating hour limitations to preclude the need to build taller stacks. Maximum operating flexibility was obtained in the air permits, without the need for emission offsets.

BVH Engineers, Inc., Southern Connecticut State University, Air Permitting – CT (Permitting Assistance: 1999 – 2001)

Mr. Anderson performed critical flaw analyses to develop a cost-effective air permitting strategy for a new boiler plant located at Southern Connecticut State University (SCSU). He conducted air quality impact analyses to determine the likely stack height requirements for two proposed locations for the boiler plant and various sulfur content limits for the proposed back up fuel (oil). He subsequently performed a quality assurance review of the air permit applications prepared for the proposed plant.

S.D. Warren Paper Company/SAPPI, PSD Permitting and Modeling – Skowhegan, ME (Project Manager: 1984 – 2000)

Mr. Anderson managed the completion of comprehensive dispersion modeling and Best Available Control Technology (BACT) analyses in support of an air emission license application for an increased power boiler heat input capacity from 900 to 1300 million British thermal units per hour (MMBtu/hr), as well as corresponding dispersion modeling in support of the original air emission license application for the boiler. For both projects the Rough Terrain Diffusion Model (RTDM) was used for the complex terrain modeling in a Class I PSD increment consumption area. Prior to and subsequent to these analyses, Mr. Anderson managed many additional dispersion modeling analyses to support other air emission license modifications at the Somerset Mill.

ERI, University of Rhode Island, Kingston Campus, Air Permitting – Kingston, RI (Project Manager: 1997 – 1998)

Mr. Anderson prepared air permit applications for a new Central Power Plant at the University of Rhode Island (URI), Kingston Campus. URI replaced the emission sources in the existing Central Boiler Plant with four new boilers and one new emergency generator. Mr. Anderson performed regulatory analyses that included a review of the State of Rhode Island Department of Environmental Management (RIDEM) air permit regulations, a Best Available Control Technology (BACT) analysis for each pollutant, and a federal regulatory analysis. He also directed the completion of the dispersion modeling analyses required for a Minor Source Permit approval.

Bowater/Great Northern Paper, Inc., Title V Permitting – Millinocket, ME (Permitting Assistance: 1995)

Mr. Anderson reviewed source information and existing emission inventories, identified regulatory requirements, assisted in providing operating flexibility

options, determined monitoring, record keeping and reporting requirements, and assisted in developing draft permit applications.

FMC Corporation, Preparation of Air Toxics and Title V Emission Inventory – Rockland, ME (Project Manager: 1992 – 1995)

Mr. Anderson managed the preparation of an air emissions inventory, emission measurement program and regulatory review to determine the applicability of the 1990 Clean Air Act Amendments (CAAA) and the State of Maine air emission regulations. The inventory included hazardous air pollutants (HAPs) and updated air emission license applications were prepared as required.

St. Francis Hospital, Pre-Construction Air Permitting – Hartford, CT (Project Manager: 1993 – 1995)

Under contract to Bard, Rao, Athanas/Sullivan Partnership (BR+A), Mr. Anderson prepared a complete air permit application for the installation of a new boiler and two emergency diesel generators at this hospital. He developed operating restrictions to minimize modeling requirements and avoid PSD permitting requirements.

Middlesex Hospital, Preparation of a NO_x RACT Plan – Middletown, CT (Project Manager: 1994)

Mr. Anderson managed the preparation of a Reasonably Available Control Technology (RACT) plan for the nitrogen oxides (NO_x) emissions of the hospital's boilers and emergency generators. The plan that was developed enabled the hospital to maintain operating flexibility as a synthetic minor source.

The William W. Backus Hospital, New Boiler Permitting – Norwich, CT (Project Manager: 1991 – 1994)

Mr. Anderson prepared permit applications for the installation of two new boilers and a diesel generator. He obtained approval of the proposed BACT emission limits and the multi-source modeling analyses that were required to demonstrate compliance with ambient air quality standards.

The Stanley Works, New Boiler Permitting – New Britain, CT (Project Manager: 1991 – 1992)

For two small boilers, Mr. Anderson managed the preparation of a complete permit application package that included BACT determinations, demonstrations of compliance with state air toxics standards and fuel use limitations to avoid the need for dispersion modeling.

Dravo Lime Company, PSD Permitting – Saginaw, AL (Project Manager: 1988 – 1989)

Mr. Anderson prepared a complete PSD air permit application package for the construction of an 800 ton per day rotary lime kiln. He developed emission estimates for criteria and toxic air pollutants, performed BACT determinations for

nitrogen oxides (NO_x) and carbon monoxide (CO) and conducted dispersion modeling and additional impacts analyses.

Dispersion Modeling

Mr. Anderson has 34 years of experience in the development, use and evaluation of air quality dispersion models. He is thoroughly familiar with the critical modeling issues involved in complex and intermediate terrain, aerodynamic downwash, fugitive dust, risk assessments, visibility (plume impairment and regional haze) and acid deposition. This experience enables him to apply models and procedures that maximize the potential for achieving realistic results in the projects he manages and conducts.

Pennsylvania Electric Company (Penelec)/GPU Genco/Sithe Energies/Reliant Energy, Model Performance Evaluations – PA (Project Manager: 1991 – 1998)

Mr. Anderson managed a series of performance evaluations of the Large Area Power Plant Effluent Study (LAPPES) model and other models, including the Complex Terrain Dispersion Model (CTDMPLUS) for Penelec's (now Reliant's) Shawville power plant near Clearfield, Pennsylvania, and the Rough Terrain Diffusion Model (RTDM) for Penelec's (now Reliant's) Warren Station in Warren, Pennsylvania and four other power plants then operated by Penelec in the Laurel Ridge/Chestnut Ridge region in southwestern Pennsylvania. Mr. Anderson demonstrated that LAPPES outperformed the other models, and received regulatory approval for the use of LAPPES to set sulfur dioxide (SO₂) emission limits in all three areas.

Yale University, Downwash Modeling Analyses – New Haven, CT (Project Manager: 1991)

Mr. Anderson managed the completion of a unique multi-source downwash modeling analysis for impacts at the air intakes of the university's laboratory complex. He evaluated the critical issue of the overlapping effect of numerous laboratory stacks and vents in the cavity regions of nearby buildings.

Prime Tanning Company, Compliance Modeling for SO₂ – Berwick, ME (Technical Director/Project Manager: 1987 – 1996)

Mr. Anderson managed or provided technical oversight for a series of dispersion modeling analyses to demonstrate compliance with the Maine Ambient Air Quality Standards (MAAQS) for sulfur dioxide (SO₂), or to support air emission license applications. For the compliance demonstrations, he directed the evaluation of the effects of stack height, limits on fuel sulfur content, the use of a single stack versus multiple stacks, the use of heat recovery devices and seasonal fuel use restrictions.

**UTC Pratt & Whitney, Main Street Facility, Cogeneration Facility
Modeling/Permitting – East Hartford, CT (Project Manager: 1989 – 1992)**

Mr. Anderson conducted comprehensive dispersion modeling analyses in support of a permit application for a 27 MW cogeneration facility. He performed complex multi-source modeling to demonstrate that the facility would not contribute significantly to modeled violations of ambient air quality standards caused by nearby sources.

**TLG Engineering, Norwalk Hospital, Cogeneration Facility
Modeling/Permitting – Norwalk, CT (Project Manager: 1991 – 1992)**

Under contract to TLG Engineering, Mr. Anderson performed dispersion modeling analyses in support of a PSD permit application for a 2.5 MW cogeneration facility that includes two dual fuel-fired gas turbines with duct burners and two auxiliary boilers. He demonstrated compliance using modeling techniques that enabled a significant cost savings via the use of a stack height well below that defined by the good engineering practice (GEP) formula.

**Scott Paper/Kimberly Clark Tissue Company, Compliance Modeling for Air
Emission License Renewal – Winslow, ME (Project Manager: 1993 – 1996)**

Mr. Anderson reviewed the mill's air emission license and developed a comprehensive inventory of data for dispersion modeling to demonstrate compliance with the Maine Ambient Air Quality Standards (MAAQS) for sulfur dioxide (SO₂), particulate matter less than ten microns in diameter (PM₁₀), nitrogen dioxide (NO₂) and carbon monoxide (CO). He successfully completed the required compliance demonstration without the need for imposing any new operating restrictions on the mill. Mr. Anderson also identified corrections to the mill's annual emissions calculations which resulted in large operating fee reductions and rebates.

**Great Northern Paper, Modeling for Strategic Planning and Air Emission
License Support – Millinocket, ME (Project Manager: Prior to 1990)**

Mr. Anderson performed a series of comprehensive dispersion modeling analyses in support of strategic planning for various proposed source modifications and an air emission license application for a major mill modernization project. The dispersion modeling was used to determine the stack heights and other project design considerations required for compliance, and the modeling for the major project successfully demonstrated compliance with the Maine Ambient Air Quality Standards (MAAQS) for sulfur dioxide (SO₂), particulate matter less than ten microns in diameter (PM₁₀), nitrogen dioxide (NO₂) and carbon monoxide (CO). Important issues addressed included the aerodynamic downwash caused by the mill structures, the appropriate meteorological data to be used, the required procedures for complex terrain modeling, and the determination of appropriate background pollutant concentrations.

SIP Development

Mr. Anderson has been involved in SIP development issues for over 28 years. He played a major role in the development of the 1979 SIP for the State of Connecticut while employed at the Department of Environmental Protection (CT DEP). While at TRC, he has prepared SIP development guidance documents on behalf of the U.S. Environmental Protection Agency (EPA) and assisted several clients to develop control strategies to comply with ambient standards.

Pennsylvania Electric Company (Penelec)/GPU Genco/Sithe Energies/Reliant Energy, Development of SIP Compliance Strategies for SO₂ – PA (Project Manager: 1991 – 2004)

Mr. Anderson managed a series of comprehensive dispersion modeling analyses, using the Large Area Power Plant Effluent Study (LAPPES) and American Meteorological Society (AMS)/Environmental Protection Agency (EPA) Regulatory Model (AERMOD), to determine allowable SO₂ emission rates for six coal-fired power plants previously operated by Penelec in Shawville, Warren and the Laurel/Chestnut Ridge region (four plants) in southwestern Pennsylvania. For these three complex terrain regions, the modeling primarily involved the determination of coal sulfur content limits, but included analyses of emission controls (scrubbers).

UTC Pratt & Whitney, Willgoos Facility, Development of SIP Compliance Strategy for SO₂ – East Hartford, CT (Project Manager: 1989 – 1994)

Mr. Anderson managed a series of dispersion modeling analyses pursuant to developing compliance strategies to eliminate model predicted violations of the National Ambient Air Quality Standards (NAAQS) for sulfur dioxide (SO₂). He evaluated strategies such as stack height increases, use of an alternative fuel, reductions in fuel sulfur content and operating hour limitations for ten large stationary fuel burning sources.

UTC Hamilton Standard, Development of SIP Compliance Strategy for SO₂ – Windsor Locks, CT (Project Manager: 1990 – 1993)

Mr. Anderson developed strategies and performed dispersion modeling analyses to resolve model-predicted violations of the National Ambient Air Quality Standards (NAAQS) for sulfur dioxide (SO₂). He demonstrated compliance and obtained regulatory approval for small stack height increases for some sources and the use of fuel with a lower sulfur content in other sources at the facility.

U.S. EPA, Development of PM₁₀ SIP Compliance Guidance – National, U.S. (Project Manager: Prior to 1990)

Mr. Anderson derived and implemented procedures for using dispersion and receptor models in the development of SIPs for particulate matter with a nominal aerodynamic diameter of less than 10 microns (PM₁₀). Mr. Anderson is the primary author of the EPA document entitled: "Example Modeling to Illustrate SIP Development for the PM₁₀ NAAQS."

Receptor Modeling

The concepts and data analyses involved in receptor modeling have been an important part of Mr. Anderson's experience. While at the CTDEP, he was responsible for the preparation of the Annual Air Quality Summaries. He worked to make analyses of the causes of the measured pollutant concentrations a major part of those reports. While at TRC, he has used this experience in support of receptor modeling studies for both EPA and industrial clients.

U.S. EPA, Development of Receptor Modeling Guidance – National, U.S. (Project Manager: Prior to 1990)

Mr. Anderson compiled a reference document that describes available dispersion and receptor modeling techniques. He is the primary author of Volume V of the EPA Receptor Model Technical Series entitled: "Source Apportionment Techniques and Considerations in Combining Their Use."

Midwest Utilities Group, Source Apportionment Analyses – Regional, U.S. (Project Manager: Prior to 1990)

Mr. Anderson analyzed ambient sulfur dioxide (SO₂), total suspended particulate matter (TSP), sulfate (SO₄) and meteorological data to determine the relative contributions of distant and local sources in western New York and western Pennsylvania. He demonstrated that local sources were the predominant contributors to the measured pollutant concentrations in those regions.

Great Northern Paper, Source Apportionment Analyses – Millinocket, ME (Project Manager: Prior to 1990)

Mr. Anderson analyzed ambient sulfur dioxide (SO₂) and meteorological data using time series analyses to identify the stack and fugitive emission sources associated with peak measured SO₂ concentrations. He demonstrated that measured concentrations were primarily attributable to fugitive and other sources near ground level rather than the major tall stack sources at the mill.

Ambient Monitoring

Mr. Anderson has evaluated and selected ambient monitoring sites for use in support of air permitting and SIP development. He is familiar with EPA siting and sampling criteria for SIP monitoring networks and PSD permitting including meteorological monitoring.

Pennsylvania Electric Company (Penelec)/GPU Genco/Sithe Energies/Reliant Energy, Sulfur Dioxide Monitor Siting – Shawville, PA (Project Manager: 1992 – 1993)

Mr. Anderson provided technical oversight for dispersion modeling analyses performed to select eight sulfur dioxide (SO₂) monitoring sites for use in a

subsequent comparative evaluation of the performance of the Complex Terrain Dispersion Model (CTDMPLUS) and the Large Area Power Plant Effluent Study (LAPPES) model at Penelec's (now Reliant's) Shawville power plant.

Finch, Pruyn & Company, Inc., Meteorological Tower Siting – Glens Falls, NY (Project Manager: 1992)

Mr. Anderson performed evaluations of multiple sites for the location of meteorological towers suitable for the collection of acceptable data for use in complex terrain and other regulatory modeling. He obtained regulatory approval for the use of a rooftop tower for stack top measurements and a separate 10 m tower for atmospheric stability measurements, avoiding the need for a tall tower at this New York mill.

Great Northern Paper, Meteorological Tower Siting – Millinocket, ME (Project Manager: Prior to 1990)

Mr. Anderson performed evaluations of multiple sites for the collection of Prevention of Significant Deterioration (PSD) quality meteorological tower data. He obtained regulatory approval for the installation of a 90 meter tower at the optimal location for both data quality and logistical support.

S.D. Warren Company, Meteorological Tower Siting, Installation and Operation – Skowhegan, ME (Project Manager: Prior to 1990)

Mr. Anderson managed the selection, installation and operation of a PSD quality meteorological tower. Data from this tower were used for the first acceptable modeling performed with the Rough Terrain Diffusion Model (RTDM) in Maine.

PROFESSIONAL AFFILIATIONS

- American Meteorological Society
- Air and Waste Management Association

SELECTED PRESENTATIONS AND PUBLICATIONS

Anderson, M.K. and Murray, D.R., "Power Plant Siting and Public Relations: Energy Deregulation and Air Quality Benefits," *Paper 70191, AWMA 96th Annual Meeting*, San Diego, California, June 2003.

Anderson, M.K. and Sampieri, S., "Experiences Using ISC-PRIME," *New England Section AWMA Specialty Conference on the Guideline on Air Quality Models: A New Beginning*, Newport, Rhode Island, April 2001.

Anderson, M.K. and Schmidt, K.A., "Performance of the CTDMPLUS and LAPPES Models in Complex Terrain," *Paper No. 96-WA63.04, AWMA 89th Annual Meeting*, Nashville, Tennessee, June 1996.

Anderson, M.K., Londergan, R.J., Brisini, V.J., and McKenzie, T.E., "Model Performance in Complex Terrain," *Paper No. 93MP2.07, AWMA 86th Annual Meeting*, Denver, Colorado, June 1993.

Anderson, M.K. and Brookman, E.T., "Preliminary Analyses at a PM10 Sampling Site Using a Combined Source Apportionment Approach," *Paper No. 8625.3, APCA 79th Annual Meeting*, Minneapolis, Minnesota, June 1986.

Anderson, M.K. and Carney, M.V., "Overview of Permit Conditions for Resource Recovery Facilities in the Northeast," *New England Section APCA Specialty Conference on the Environmental Implications of Resource Recovery*, Providence, Rhode Island, April 1986.

Anderson, M.K. and Walker, V.R., "Interstate Transport of Particulate Matter: Issues of Data Representativeness, Accuracy and Interpretation," *Paper No. 8234.3, APCA 75th Annual Meeting*, New Orleans, Louisiana, June 1982.

Anderson, M.K. and Wight, G.D., "New Source Review: An Ambient Assessment Technique," *Paper No. 782.4, APCA 71st Annual Meeting*, Houston, Texas, June 1978.

Anderson, M.K., "Power Plant Impact on Ambient Air: Coal vs. Oil Combustion," *Paper No. 7533.5, APCA 68th Annual Meeting*, Boston, Massachusetts, June 1975.